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ABSTRACT

The Preliminary Information Exchange Procedures (IEP) cost study project was undertaken as a joint venture by a group of colleges and universities and the National Center for Higher Education Management Systems (NCHEMS) The project was initiated and sponsored by NCHEMS to accomplish six objectives that would benefit both the institutions and NCHEMS. The project objectives were as follows: (1) Exchange Procedures Manual" to provide data for evaluating the utility and feasibility of those procedures and definitions. (2) To implement and test the NCHEMS planning and management software tools on available computers at colleges and universities participating in the preliminary IEP project. (3) To develop institutional expertise in using NCHEMS management tools. (4) To evaluate the IEP cost study implementation effort in terms of institutional benefits and required compatible information with similar institutions. (6) To determine the availability and accessibility of institutional historical data required for completion of the preliminary IEP cost study. (Author)

National Center for Higher Education Management Systems at WICHE

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EXPLORING COST EXCHANGE AT COLLEGES AND UNIVERSITIES

A Report on the 1973 Field Test of
NCHEMS's Preliminary Information Exchange and Reporting
Procedures at 70 Institutions

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To design, develop, and encourage the implementation of management information systems and data bases including common data elements in institutions and agencies of higher education that will:

- provide improved information to higher education administration at all levels.
- facilitate exchange of comparable data among institutions.
- facilitate reporting of comparable information at the state and national levels.

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INTRODUCTION

The preliminary Information Exchange Procedures (IEP) cost study project was undertaken as a joint venture by a group of colleges and universities and the National Center for Higher Education Management Systems (NCHEMS). The project was initiated and sponsored by NCHEMS to accomplish six objectives that would benefit both the institutions and NCHEMS. The project objectives were as follows:

1. To field test the conventions contained in the NCHEMS Preliminary Reporting and Exchange Procedures Manual (Romney, Topping and Manning, 1973) to provide data for evaluating the utility and feasibility of those procedures and definitions.

2. To implement and test the NCHEMS planning and management software tools on available computers at colleges and universities participating in the preliminary IEP project.

3. To develop institutional expertise in using NCHEMS management tools.

4. To evaluate the IEP cost study implementation effort in terms of:
   a. Institutional benefits.
   b. Required personpower and costs.

5. To determine the benefits to management of exchanging compatible information with similar institutions.

6. To determine the availability and accessibility of institutional historical data required for completion of the preliminary IEP cost study.

This project, initiated in April 1973, included many community, private, and state colleges and universities in diverse geographical locations. Most of the institutions in the field test consortium were primarily instructional in nature and function. Table 1 displays the participating consortium institutions and their locations. The project was initiated when NCHEMS held meetings with representatives from the consortium institutions in April and May. At each meeting with institutional representatives, the discussion centered on the following items:

1. The objectives of the project.

2. The conventions (i.e., definitions and procedures) that were to be followed by the participating institutions in collecting and displaying costs and other descriptive data.

3. The role of NCHEMS staff during the project and the type of assistance the staff would provide to the participating institutions.

PRELIMINARY INFORMATION EXCHANGE PROCEDURES PARTICIPATING INSTITUTIONS

TABLE 1

COMMUNITY COLLEGE CONSORTIUM

BLACK HAWK COLLEGE
Moline, Illinois

CENTRAL NEBRASKA TECHNICAL COLLEGE
Hastings, Nebraska

CLAYTON JUNIOR COLLEGE
Morrow, Georgia

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
Pittsburgh, Pennsylvania

COMMUNITY COLLEGE OF PHILADELPHIA
Philadelphia, Pennsylvania

COUNTY COLLEGE OF MORRIS
Dover, New Jersey

DELTA COLLEGE
University Center, Michigan

GATEWAY TECHNICAL INSTITUTE
Kenosha, Wisconsin

MONROE COMMUNITY COLLEGE
Rochester, New York

MOUNT HOOD COMMUNITY COLLEGE
Gresham, Oregon

NEW MEXICO JUNIOR COLLEGE
Hobbs, New Mexico

NORMANDALE COMMUNITY COLLEGE
Bloomington, Minnesota

NORTH DAKOTA STATE SCHOOL OF SCIENCE
Wahpeton, North Dakota

NORTHERN VIRGINIA COMMUNITY COLLEGE
Annandale, Virginia

RHODE ISLAND JUNIOR COLLEGE
Providence, Rhode Island

ST. PETERSBURG JUNIOR COLLEGE
St. Petersburg, Florida

SEATTLE COMMUNITY COLLEGE
Seattle, Washington

TRINIDAD STATE JUNIOR COLLEGE
Trinidad, Colorado

TRITON COMMUNITY COLLEGE
River Grove, Illinois

STATE COLLEGE/UNIVERSITY CONSORTIUM

CALIFORNIA STATE COLLEGE
Fullerton, California

CENTRAL STATE UNIVERSITY
Edmond, Oklahoma

CENTRAL WASHINGTON STATE COLLEGE
Ellensburg, Washington

CONCORD COLLEGE
Athens, West Virginia

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia

KEARNEY STATE COLLEGE
Kearney, Nebraska

MANSFIELD STATE COLLEGE
Mansfield, Pennsylvania

MEMPHIS STATE UNIVERSITY
Memphis, Tennessee

NORTH CAROLINA AGRICULTURAL & TECHNICAL STATE UNIVERSITY
Greensboro, North Carolina

NORTHERN MICHIGAN UNIVERSITY
Marquette, Michigan

RHODE ISLAND COLLEGE
Providence, Rhode Island

SHIPPENSBURG STATE COLLEGE
Shippensburg, Pennsylvania

SOUTHERN OREGON COLLEGE
Ashland, Oregon

STATE UNIVERSITY OF NEW YORK
Plattsburgh, New York

UNIVERSITY OF MAINE
Presque Isle, Maine

UNIVERSITY OF NORTH DAKOTA
Grand Forks, North Dakota

UNIVERSITY OF NORTHERN COLORADO
Greeley, Colorado

UNIVERSITY OF WEST FLORIDA
Pensacola, Florida

UNIVERSITY OF WISCONSIN
LaCrosse, Wisconsin

WEBER STATE COLLEGE
Ogden, Utah

WEST TEXAS STATE UNIVERSITY
Canyon, Texas

WEST VIRGINIA INSTITUTE OF TECHNOLOGY
Montgomery, West Virginia

WESTERN MICHIGAN UNIVERSITY
Kalamazoo, Michigan

WICHITA STATE UNIVERSITY
Wichita, Kansas

WILLIAM PATERSON COLLEGE
Wayne, New Jersey

ADDITIONAL UNIVERSITIES

OREGON STATE UNIVERSITY
Corvallis, Oregon

PENNSYLVANIA STATE UNIVERSITY
University Park, Pennsylvania

SOUTHERN METHODIST UNIVERSITY
Dallas, Texas

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

UNIVERSITY OF HOUSTON
Houston, Texas

UNIVERSITY OF NEW MEXICO
Albuquerque, New Mexico

UNIVERSITY OF PENNSYLVANIA
Philadelphia, Pennsylvania

UNIVERSITY OF PITTSBURGH
Pittsburgh, Pennsylvania

PRIVATE COLLEGE CONSORTIUM

BETHEL COLLEGE
St. Paul, Minnesota

BRADLEY UNIVERSITY
Peoria, Illinois

BUCKNELL UNIVERSITY
Lewisburg, Pennsylvania

CLARKSON COLLEGE OF TECHNOLOGY
Potsdam, New York

COLLEGE OF WOOSTER
Wooster, Ohio

DRAKE UNIVERSITY
Des Moines, Iowa

EMERSON COLLEGE
Boston, Massachusetts

FISK UNIVERSITY
Nashville, Tennessee

LAWRENCE UNIVERSITY
Appleton, Wisconsin

MACALESTER COLLEGE
St. Paul, Minnesota

McPHERSON COLLEGE
McPherson, Kansas

OBERLIN COLLEGE
Oberlin, Ohio

POMONA COLLEGE
Claremont, California

RIDER COLLEGE
Trenton, New Jersey

SAINT JOSEPH'S COLLEGE
Rensselaer, Indiana

SAINT OLAF COLLEGE
Northfield, Minnesota

TRINITY COLLEGE
Hartford, Connecticut

TUSKEGEE UNIVERSITY
Tuskegee, Alabama

UNIVERSITY OF SCRANTON
Scranton, Pennsylvania

WILLIAMS COLLEGE
Williamstown, Massachusetts

While the Preliminary Reporting and Exchange Procedures Manual established the definitions and procedures for the field test consortium cost study, those initial guidelines were merely being tested and thus were subject to change. In fact, based on the consortium field test, changes have been recommended. Therefore, the definitions and procedures followed during this initial field test were somewhat different from those that will be recommended for use in the future.

Contributions to the preliminary IEP field test project by NCHEMS were in the form of coordination and consulting service from NCHEMS staff. This limited support aided in reducing the time required to complete the project. As a consortium participant reached a pre-established milestone, an NCHEMS staff member visited the institution to review and evaluate the implementation effort. These periodic visits (approximately three per institution) provided the institutions with the assurance that the project definitions and procedures for collecting institutional data were being followed.

DEFINITIONS AND PROCEDURES

One of the major objectives of the preliminary IEP field test was to attempt to develop compatible cost information across a number of institutions. To realize this objective, the participating institutions were asked to use the structure, definitions, and procedures outlined in the Preliminary Reporting and Exchange Procedures Manual. It is not the purpose of this paper to outline in detail the structure, definitions, and procedures followed by the consortium schools during the project; therefore, only some major aspects of the common structure, definitions, and procedures will be discussed here.

The Structure

The NCHEMS Program Classification Structure (Gulko, 1972) provided the framework of activity centers for categorizing, aggregating, and displaying the institutional cost data. This structure (Table 2) can be separated into two major categories: (1) final cost objectives and (2) support activity centers. Direct costs were determined for all activity centers. In the instructional area (1.1 and 1.2) the structure was expanded by each institution to define each of its disciplines at lower division, upper division, and graduate course levels as a discrete activity center.

To arrive at full costs of primary activities, the support activity center direct costs were allocated across the appropriate final cost objectives. Capital equipment and facilities costs were not included in the preliminary

TABLE 2

PRELIMINARY INFORMATION EXCHANGE PROCEDURES
DESIGNATION OF SUPPORT COST CENTERS AND FINAL COST OBJECTIVES

Activity Center Code	Activity Center Name	Support Activity Center	Final Cost Objective
1.1.XXXX.XX	General Academic Instruction*		X
1.2.XXXX.XX	Occupational and Vocational Instruction*		X
1.3	Special Session Instruction		X
1.4	Extension Instruction		X
2.1	Institutes and Research Centers		X
2.2	Individual or Project Research		X
3.1	Community Education		X
3.2	Community Service		X
3.3	Cooperative Extension Service		X
4.1	Libraries and Audio-Visual Services	X	
4.2	Museums and Galleries	X	
4.4	Computing Support (Instruction)	X	
4.5	Ancillary Support (except teaching hospitals)	X	
4.5	Teaching Hospitals		X
4.6	Academic Administration and Personnel Development	X	
4.7	Course and Curriculum Development	X	
5.1.7100	Student Development	X	
5.1.7200	Intercollegiate Athletics		X
5.2	Supplementary Educational Service	X	
5.3	Counseling and Career Guidance	X	
5.4	Financial Aid (Administration)	X	
5.5	Student Support		X
6.1	Executive Management	X	
6.2	Fiscal Operations	X	
6.3	General Administrative Services	X	
6.4	Logistical Services		
6.5	Physical Plant Operations	X	
6.6	Faculty and Staff Services		X
6.7	Community Relations	X	
7.0	Independent Operations		X

*delineated to discipline and course level

IEP field test, and thus capital consumption does not appear on the structure. The final version of the NCHEMS Information Exchange Procedures will deal with capital consumption, and under those procedures full costs of primary activities will include allocated capital costs as well as allocations from other support activity centers.

Definitions

The participating institutions faced the problem of determining their direct costs for each activity center and then developing unit costs for each instructional discipline and degree or certificate program. This required a careful examination of expenditures tabulated by the accounting system and crossing over those expenditures from the school's unique chart of accounts to the standard activity structure. To maintain comparability, it was imperative that certain key definitions be established and followed by all participating institutions. Some of the more important definitions and procedures are listed below.

1. The cost data were developed using operating account expenditures from one entire fiscal year (in almost all cases, 1972-73). However, the unit costs of instructional disciplines and programs reflect expenditures for only the major academic planning period of the institution (usually the nine-month academic year).

2. Unit costing for disciplines at lower division, upper division, and graduate course levels was based on semester credits attempted (quarter credits were converted on a 3-to-2 basis) as of the institution's regular recording point of each term.

3. Unit costing for degree and certificate programs was based on full-time equivalent students (FTE). An FTE student was defined as 30 semester credits taken in a degree program at undergraduate levels and 24 semester credits taken at graduate levels. Discipline credits and their unit costs were crossed over to programs by means of an instructional workload matrix (IWLM). Program costs per FTE student major were developed at four student levels:

   a. Lower Division.
   b. Upper Division.
   c. Graduate I (master's level).
   d. Graduate II (doctoral level).

4. Direct costs were defined as including:

   a. Compensation (salaries, wages, and benefits).
   b. Supplies and services.
   c. Equipment paid for out of the operating budget.
   d. First level administration costs (department chairmen, where they occured).

5. To distribute faculty salaries among the disciplines and to levels of instruction within disciplines, an assignment analysis was completed for each individual faculty member. Compensation paid to each individual was distributed in proportion to his or her teaching assignments.

6. The discipline direct costs other than faculty salaries were allocated to each course level on the basis of the faculty salary distribution determined by the assignment analysis.

7. Full unit costs for disciplines and instructional programs were obtained by allocating such support costs as libraries, executive management, physical plant maintenance, and so forth across the activity centers designated as final cost objectives by means of one or more of the following parameters:

   a. Direct costs.
   b. Semester credits.
   c. FTE professionals.

Table 3 defines the specific allocation parameters used for each support activity center.

The Process

The process of actually carrying out the cost study on each campus was assisted by certain computer software packages provided by NCHEMS. These tools included:

1. ICLM/IWLM Generator.
2. Faculty Data Generator.
3. Cost Finding Principles Software.
4. Resource Requirements Prediction Model 1.6.

TABLE 3

PRELIMINARY INFORMATION EXCHANGE PROCEDURES ALLOCATION PARAMETERS AND FINAL COST OBJECTIVES RECEIVING SUPPORT COSTS

Support Activity Center Code	Support Activity Center Name	Recommended Allocation Parameter*	Final Cost Objectives Receiving Support Costs
4.1	Libraries and Audio-Visual Services	50% on FTE Profess. 50% on Semester Credits	1.1 - 3.3
4.2	Museums and Galleries	Direct Costs	1.1 - 3.3
4.4	Computing Support	Direct Costs (if actual usage data are not available)	1.1 - 3.3
4.5.XX00	Ancillary Support (by HEGIS discipline category)	Direct Costs	1.1 - 3.3 (as appropriate)
4.6	Academic Administration and Personnel Development	Direct Costs	1.1 - 3.3
4.7	Course and Curriculum Development	FTE Professionals	1.1 - 1.4
5.1.7100	Student Development	Semester Credits	1.1 - 1.4
5.2	Supplemental Educational Service	Semester Credits	1.1 - 1.4
5.3	Counseling and Career Guidance	Semester Credits	1.1 - 1.4
5.4	Financial Aid (Administration)	Semester Credits	1.1 - 1.4
6.1	Executive Management	Direct Costs	All Final Cost Objectives**
6.2	Fiscal Operations	Direct Costs	All Final Cost Objectives**
6.3	General Administrative Services	Direct Costs	All Final Cost Objectives**
6.4	Logistical Services	Direct Costs	All Final Cost Objectives**
6.5	Physical Plant Operations	Direct Costs	All Final Cost Objectives**
6.7	Community Relations	Direct Costs	1.1 - 3.3

***NOTE that these are recommended allocation parameters. Actual use data are preferable.**

****Except 7.0, Independent Operations**

Most of the participating institutions used all of these software packages during the collection, aggregation, and manipulation of their cost study data. Some substituted their own locally developed software during certain aspects of the field test. The field test experience has disclosed numerous ways in which the NCHEMS software can be improved and made more convenient for local institutions that wish to conduct an IEP type cost study. Consequently, new IEP cost study software packages will be made available by NCHEMS in the future.

Cost Data Display

To assess the utility and feasibility of the initial IEP definitions and procedures, the consortium institutions were asked to produce certain cost data for exchange among themselves. These data were displayed in individual documents by the consortium institutions completing the preliminary IEP field test project. The types of cost data displayed in these documents include three major areas: (1) unit costs of instructional disciplines, (2) unit costs of degree and certificate programs, and (3) total institutional direct expenditures for each activity center.

Tables 4 and 5 display samples of instructional discipline unit cost data at lower division, upper division, and graduate division course levels. Tables 6 and 7 display samples of degree program unit cost data at lower division, upper division, and graduate student levels. Table 8 displays one participating institution's direct expenditures attached to the standard activity center structure. These examples, which represent a small portion of the institutions participating in the cost study, were taken from the documents developed by the State University of New York, Plattsburgh campus; the County College of Morris Community College of New Jersey; the Georgia

TABLE 4

STATE UNIVERSITY OF NEW YORK AT PLATTSBURGH
Plattsburgh, New York

INSTRUCTIONAL DISCIPLINE COSTS
ACADEMIC YEAR 1972-73

(Fall and Spring Semesters)

Discipline Title	Number of Credits	Direct Cost Per Semester Credit	Full Cost Per Semester Credit	FTE Faculty to Credit Hour Ratio
Administrative Science (0506)				
Lower Division	1,533	$ 22	$ 38	1 to 1,111
Upper Division	1,255	16	29	1 to 1,589
Anthropology (2202)				
Lower Division	3,405	17	31	1 to 1,091
Upper Division	1,257	36	59	1 to 590
Art (1090)				
Lower Division	4,914	39	64	1 to 531
Upper Division	1,550	52	85	1 to 369
Graduate Division	7	236	357	1 to 117
Astronomy (1911)				
Lower Division	747	37	61	1 to 508

TABLE 5

COUNTY COLLEGE OF MORRIS
Dover, New Jersey

INSTRUCTIONAL DISCIPLINE COSTS
ACADEMIC YEAR 1972-73

(Fall and Spring Semesters)

Discipline Title	Number of Credits	Direct Cost Per Semester Credit	Full Cost Per Semester Credit	FTE Faculty to Credit Hour Ratio
Accounting (0502)	4,423	$ 20	$ 38	1 to 716
Art (1002)	2,697	25	32	1 to 544
Biology (0401)	7,675	22	42	1 to 703
Business (0501)	5,220	18	35	1 to 814

TABLE 6

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia

INSTRUCTIONAL PROGRAM COSTS
FISCAL YEAR 1972-73

(Summer, Fall, Winter, and Spring Quarters)

Program Title	No. of Exchange FTE Majors	Quarter Credit Hrs. Definition of Exchange FTE Majors	No. of Quarter Credit Hrs. Req. for Graduation	Direct Annual Cost Per Exchange FTE Major	Full Annual Cost Per Exchange FTE Major
Aerospace Engineering					
Lower Division	137	45		$ 814	$1,247
Upper Division	108	45	201	1,414	2,019
Graduate-1	51	36	33/50	2,821	3,819
Graduate-2	55	36	80	3,344	4,502
Architecture					
Lower Division	379	45		861	1,310
Upper Division	212	45	271	1,679	2,386
Graduate-1	11	36	33/50	1,607	2,259
Chemical Engineering					
Lower Division	208	45		954	1,428
Upper Division	193	45	206	1,511	2,145
Graduate-1	28	36	33/50	4,728	6,291
Graduate-2	19	36	80	5,144	6,835
Chemistry					
Lower Division	99	45		816	1,250
Upper Division	72	45	199	1,061	1,574
Graduate-1	32	36	33/50	3,439	4,648
Graduate-2	74	36	80	3,644	4,915

TABLE 7

SEATTLE COMMUNITY COLLEGE DISTRICT

Seattle, Washington

INSTRUCTIONAL PROGRAM COSTS
ACADEMIC YEAR - Summer 1971 thru Spring 1972

(Four Quarters)

Instructional Programs	No. of Exchange FTE Majors	Quarter Credit Hrs. Definition of Exchange FTE Major	No. of Quarter Credits Required For Graduation	Direct Annual Cost Per Exchange FTE Major	Full Annual Cost Per Exchange FTE Major
5202 Dental Occupations	88	45	90	$775	$1,284
5209 Nursing Occupations	494	45	90	496	942
5214 Medical Assisting	69	45	90	779	1,377
5302 Aircraft Mechanics	358	45	90	699	1,089
5305 Chemical Technology	23	45	90	914	1,519
5306 Auto Body Rebuild	72	45	90	828	1,327
5306 Automotive Mechanics	186	45	90	847	1,344

TABLE 8

UNIVERSITY OF NEW MEXICO
Albuquerque, New Mexico

INSTITUTIONAL DIRECT EXPENDITURE DISPLAY -- 1972-73

NCHEMS PROGRAM CLASSIFICATION STRUCTURE		TOTAL DIRECT EXPENDITURES
1.1	General Academic Instruction	$14,089,611
1.2	Occupational and Vocational Instruction	
1.3	Summer Session Instruction	658,789
1.4	Extension Instruction	47,902
2.1	Institutes and Research Centers	8,180,178
2.2	Individual or Project Research	3,861,234
3.1	Community Education (see 1.4, Extension and Continuing Education)	286,517
3.2	Community Service	4,172,104
3.3	Cooperative Extension Service	
4.1	Libraries and Audio-Visual Services	1,622,831
4.2	Museums and Galleries	201,986
4.4	Computing Support (Instructional)	950,446
4.5	Ancillary Support	24,536
4.6	Instructional Deans and Personnel Development	1,381,900
4.7	Course and Curriculum Development*	
5.1.7100	Student Development	964,143
5.1.7200	Intercollegiate Athletics	1,158,917
5.2	Supplementary Educational Services	187,006
5.3	Counseling and Career Guidance	178,363
5.4.0050	Financial Aid Counseling	70,280
5.4.0060	Work-Study and Student Employment**	30,000
5.5	Student Support	5,551,943
6.1.8110	Executive Direction	388,749
6.1.8130	Legal Services	34,041
6.2	Fiscal Operations	502,174
6.3.8160	Management Systems and Data Processing	607,554
6.3.8220	Student Admissions and Records	495,591
6.3.8230	Employee Personnel and Records (includes non-instructional staff benefits)	583,003
6.4	Logistical Services	2,211,282
6.5	Physical Plant Operations	2,948,727
6.6	Faculty and Staff Services	9,561
6.7	Community Relations	250,925
	TOTAL	$51,650,293

*Total Direct Expenditures are unidentifiable and included in 1.1.
**Total value of loans, scholarships (including athletic scholarships), and stipends is approximately $2.6 million.

Institute of Technology; the Seattle Community College; and the University of New Mexico.

The discipline data in Tables 4 and 5 are divided into four columns:

1. Number of credits.
2. Direct cost per semester credit.
3. Full cost per semester credit.
4. FTE faculty credit hour ratio.

The first column represents the total number of credit hours attempted in each discipline during the time period studied (i.e., Major academic planning period).

The direct cost per semester credit (column 2) was derived by dividing the direct instructional cost of each instruction level of each discipline by the total credits of the discipline at each level.

Full unit costs for disciplines (column 3) were obtained by allocating such support costs as libraries, executive management, physical plant maintenance, and so forth (see Table 3) across the final cost objectives by means of one or more parameters prior to the calculation of the cost per semester credit.

The fourth column defines the number of credit hours produced by an average full-time-equivalent faculty member teaching at each course level within a discipline. It is calculated by dividing the number of FTE faculty for a given course level of a specific discipline into the total number of credit

hours produced in the corresponding discipline at that level. Variations in this rate of faculty credit hour productivity frequently provide some insight into the reasons for unit cost variations among disciplines and course levels.

The program data in Tables 6 and 7 are divided into five columns:

1. Number of exchange FTE majors.
2. Credit hour definition of exchange FTE majors.
3. Number of credits required for graduation.
4. Direct annual cost per exchange FTE major.
5. Full annual cost per exchange FTE major.

The first column identifies the number of full-time-equivalent students enrolled at a given student level of a specific degree or certificate program. For the purpose of the preliminary IEP field test, one FTE student major consisted of thirty (30) semester credits or forty-five (45) quarter credits per academic year for undergraduate student levels and twenty-four (24) semester credits or thirty-six (36) quarter credits for graduate student levels. These definitions are shown in data column two of Tables 6 and 7.

The third data column indicates the number of credit units required by the institution for a student in a specific major and level to graduate.

The direct annual cost per FTE student major represents one of the important data items resulting from the cost study. It provides a common denominator for comparing costs of degree programs both within a single institution and across institutional boundaries. The direct annual cost per major is composed

of the same costs as the discipline direct costs per semester credit. The cost data have simply been redistributed from disciplines to degree programs by using the instructional workload matrix (IWLM). Like the full unit costs for disciplines, the program full unit costs result from distributing certain support costs such as libraries, physical plant, and so forth (see Table 3), across the final cost objectives prior to calculation of the unit costs.

A majority of the institutions participating in the preliminary IEP field test completed individual documents containing cost data displays such as those illustrated in Tables 4 through 8. In addition, the individual campus documents contain descriptive data that provides the reader with some information about the objectives, student clientele, and general nature of the institution. These documents have been exchanged among all participating schools.

COSTS OF IMPLEMENTATION

The cost of implementing the IEP cost study on local campuses is of major concern to NCHEMS as it seeks to develop acceptable standard costing conventions. For this reason, each of the preliminary IEP cost study institutions was asked to keep a log of its various costs in conducting the field test. The results of those records are displayed in Table 9 on the following pages.

TABLE 9

PRELIMIMARY IEP COST STUDY IMPLEMENTATION EXPENDITURES*

Community Colleges and Two Year Technical Schools

	New Mexico Junior College Hobbs, N. M.	Central Tech. Comm. College Hastings, Neb.	North Dakota State School of Science Wahpeton, N.D.	Normandale Comm. College Bloomington, Minn.	Gateway Tech. Institute Kenosha, Wis.	Rhode Island Junior College Providence, RI.	County College of Morris Dover, N.J.	Seattle Comm. College Seattle, Wash.	Delta College University Ctr, Mich.
Exchange FTE Student Enrollment	844	926	3,658	2,042	5,740	3,583	3,488	10,265	4,018
Direct Cash Expenditures									
Analytical Staff	$1,600								
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS	200		$ 150		$ 200	$ 200	$ 200	$ 200	$ 200
Computer Time Purchase									
Supplies and Miscellaneous	100	$ 455	327		600		488		50
Total Cash Expenditures	$1,900	$ 455	$ 477	- 0 -	$ 800	$ 200	$ 688	$ 200	$ 250
Imputed Expenditures									
Analytical Staff		1,532	600	$ 950	1,200	24,076	520	4,470	11,500
Administrative Staff	475	560	480		400	6,360	305	2,368	
Clerical and Keypunch Staff			150			575	82	199	450
Computer Time	2,070	1,836	1,230	600	2,500	1,588	2,370	2,573	6,000
Supplies and Miscellaneous	69	390							
Total Imputed Expenditures	$2,614	$4,318	$2,460	$1,550	$4,100	$32,599	$3,277	$9,780	$17,950
TOTAL CASH AND IMPUTED EXPENDITURES	$4,514	$4,773	$2,937	$1,550	$4,900	$32,799	$3,965	$9,980	$18,200

*Data collected and published as of February 1, 1974.

TABLE 9

PRELIMINARY IEP COST STUDY IMPLEMENTATION EXPENDITURES

Community Colleges and Two Year Technical Schools

	Triton Comm. College River Grove, Ill.	Monroe Comm. College Rochester, N.Y.	St. Petersburg Junior College St. Petersburg, Florida	No. Virginia Comm. College Annandale, Virginia	Mount Hood Comm. College Gresham, Oregon	Clayton Junior College Morrow, Georgia	Comm. College of Philadelphia Philadelphia, Pennsylvania		
Exchange FTE Student Enrollment	5,033	8,943	6,807	7,194	4,458	2,114	4,208		
Direct Cash Expenditures									
Analytical Staff									
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS	$ 200	$ 235	$ 200	$ 200	$ 200		$ 200		
Computer Time Purchase				4,000					
Supplies and Miscellaneous	98			1,625					
Total Cash Expenditures	$ 298	$ 235	$ 200	$5,825	$ 200	- 0 -	$ 200		
Imputed Expenditures									
Analytical Staff	2,987	960	1,200	720	720	$1,650	1,800		
Administrative Staff	97		400	1,360	2,400				
Clerical and Keypunch Staff	123	80			200		20		
Computer Time	1,112	660	3,600		1,600	480	1,314		
Supplies and Miscellaneous	327	100	100	650		60			
Total Imputed Expenditures	$4,646	$1,800	$5,300	$2,730	$4,920	$2,190	$3,134		
TOTAL CASH AND IMPUTED EXPENDITURES	$4,944	$2,035	$5,500	$8,555	$5,120	$2,190	$3,334		

TABLE 9

PRELIMINARY IEP COST STUDY IMPLEMENTATION EXPENDITURES

State Colleges and Universities

	State University of New York Plattsburgh, NY	University of Maine Presque Isle, Maine	Shippensburg State College Shippensburg, Pennsylvania	University of New Mexico Albuquerque, New Mexico	University of Wisconsin LaCrosse, Wisconsin	California State University Fullerton, California	Rhode Island College Providence, Rhode Island	Georgia Inst. of Technology Atlanta, Georgia	Northern Mich. University Marquette, Michigan
Exchange FTE Student Enrollment	4,912	832	4,383	15,278	6,329	12,649	8,204	8,048	8,053
Dire t Cash Expenditures									
Analytical Staff									
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS	$ 200	$ 200		$ 150	$ 200	$ 100	$ 200	$ 150	$ 200
Computer Time Purchase									
Supplies and Miscellaneous		375							
Total Cash Expenditures	$ 200	$ 575	- 0 -	$ 150	$ 200	$ 100	$ 200	$ 150	$ 200
Imputed Expenditures									
Analytical Staff	1,687	1,035	$1,408	480	3,400	2,000	1,520	1,700	2,500
Administrative Staff		1,080		260		500	1,350	1,000	
Clerical and Keypunch Staff	223		12	48			160	600	64
Computer Time	950	1,512	2,150	584	2,850	450	1,680	3,850	2,280
Supplies and Miscellaneous				355				300	660
Total Imputed Expenditures	$2,860	$3,627	$3,570	$1,727	$6,250	$2,950	$4,710	$7,450	$5,504
TOTAL CASH AND IMPUTED EXPENDITURES	$3,060	$4,202	$3,570	$1,877	$6,450	$3,050	$4,910	$7,600	$5,704

TABLE 9

PRELIMINARY IEP COST STUDY IMPLEMENTATION EXPENDITURES

State Colleges and Universities

	Mansfield State College Mansfield, Pennsylvania	Kearney State College Kearney, Nebraska	University of North Dakota Grand Forks, North Dakota	Central State University Edmond, Oklahoma	Cent. Washington State College Ellensburg, Washington	University of No. Colorado Greeley, Colorado			
Exchange FTE Student Enrollment	3,300	4,397	7,872	10,521	6,448	10,350			
Direct Cash Expenditures									
Analytical Staff									
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS		$ 200	$ 50	$ 200	$ 200	$ 200			
Computer Time Purchase									
Supplies and Miscellaneous		220							
Total Cash Expenditures	- 0 -	$ 420	$ 50	$ 200	$ 200	$ 200			
Imputed Expenditures									
Analytical Staff	$1,408	2,100	540	1,720	5,603	600			
Administrative Staff			1,200						
Clerical and Keypunch Staff	12		700	214		28			
Computer Time	2,355	1,260	2,250	950	3,825	900			
Supplies and Miscellaneous			75			30			
Total Imputed Expenditures	$3,775	$3,360	$4,765	$2,884	$9,428	$1,558			
TOTAL CASH AND IMPUTED EXPENDITURES	$3,775	$3,780	$4,815	$3,084	$9,628	$1,758			

TABLE 9

PRELIMINARY IEP COST STUDY IMPLEMENTATION EXPENDITURES

Private Colleges and Universities

	University of Scranton Scranton, Pennsylvania	Bethel College St. Paul, Minnesota	St. Joseph's College Rensselaer, Indiana	Fisk University Nashville, Tennessee	Trinity College Hartford, Connecticut	Macalester College St. Paul, Minnesota	Pomona College Claremont, California	Rider College Trenton, New Jersey	Clarkson College of Technology Potsdam, New York
Exchange FTE Student Enrollment	2,620	1,150	1,200	1,550	1,600	1,820	1,342	4,733	2,418
Direct Cash Expenditures		Bethel College contracted with an outside firm to develop data processing operating systems and to assist the college in planning and management systems activities.							
Analytical Staff									
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS	$ 200		$ 150	$ 150		$ 200	$ 200	$ 200	$ 200
Computer Time Purchase			968	5,690					
Supplies and Miscellaneous	230		2,214					150	175
Total Cash Expenditures	$ 430	$3,500	$3,182	$5,840	- 0 -	$ 200	$ 200	$ 350	$ 375
Imputed Expenditures									
Analytical Staff	1,500		2,500	5,650		2,000	470	10,000	1,870
Administrative Staff				350	$1,920	150			
Clerical and Keypunch Staff							1,246		
Computer Time	1,600		300	180	500	1,000	1,031	3,000	1,750
Supplies and Miscellaneous				3,630			50		
Total Imputed Expenditures	$3,100	- 0 -	$2,800	$9,810	$2,420	$3,150	$2,797	$13,000	$3,620
TOTAL CASH AND IMPUTED EXPENDITURES	$3,530	$3,500	$6,132	$15,650	$2,420	$3,350	$2,997	$13,350	$3,995

TABLE 9

PRELIMINARY IEP COST STUDY IMPLEMENTATION EXPENDITURES

Private Colleges and Universities

	Williams College Williamstown, Massachusetts	St. Olaf College Northfield, Minnesota							
Exchange FTE Student Enrollment	1,757	2,526							
Direct Cash Expenditures		St. Olaf College contracted with an outside firm to develop data processing operating systems and to assist the college in planning and management systems activities.							
Analytical Staff									
Administrative Staff									
Clerical and Keypunch Staff									
Computer Software Purchase from NCHEMS									
Computer Time Purchase									
Supplies and Miscellaneous									
Total Cash Expenditures	- 0 -	$4,000							
Imputed Expenditures									
Analytical Staff	$1,250								
Administrative Staff									
Clerical and Keypunch Staff	100								
Computer Time	685								
Supplies and Miscellaneous	50								
Total Imputed Expenditures	$2,085	- 0 -							
TOTAL CASH AND IMPUTED EXPENDITURES	$2,085	$4,000							

OBSERVATIONS

After completing the preliminary IEP cost study, technical and administrative personnel on each campus were asked to respond to a questionnaire. This questionnaire asked each individual to provide a description of any difficulties encountered in implementing computer software, understanding the systems documentation, collecting institutional data, or working within the standard procedures prescribed in the Preliminary Reporting and Exchange Procedures Manual. Questions also were directed to institutional personnel relative to the general attitude and commitment on the part of the faculty and administrative staff as the cost study was being conducted. The results of the questionnaire have been useful to NCHEMS in gaining improved understanding of both the utility and the problems related to conducting a standardized cost study on a local campus.

Institutional personnel indicated that it is probably too early to determine how the campuses plan to incorporate cost study results in their planning and budgeting processes. While nearly all institutional representatives indicated that they expect the kinds of information produced by the cost study to be of assistance for both internal planning and meeting the reporting requirements of outside funding agencies, they were not quite sure at this time how the data would be employed or exactly what the impact of the data on future decisions might be. The institutional personnel indicated a wide range of potential and intended uses for the IEP cost data, including: (1) long range planning, (2) current budget preparation, (3) facilities planning, (4) negotiation with faculty committees and unions, (5) negotiation with funding agencies,

and (6) impetus for altering and improving the operational data systems of the institution. Clearly, most institutional personnel feel that comparative program cost data will improve their decision-making ability relative to the continuation of old programs and the initiation of new programs. Many institutions feel that a great deal of additional descriptive information will be needed for informed decisions to become possible. Indeed, many institutions are currently beginning to modify the NCHEMS management tools to suit their own internal needs and are augmenting the NCHEMS procedures with efforts to collect and display descriptive information related to student, faculty, and many other aspects of the organizational operation. Most institutions feel that they can derive only limited utility from internal cost data comparisons. A need for comparative costs and other data from similar types of institutions is widely expressed. Such comparative data would provide "bench marks" for internal planners on local campuses.

Gaining acceptance of the cost study results from both faculty and administrative staff was a definite problem on several campuses. The consortium institutions described a general reluctance to change; one of their major problems was to find mechanisms for thoroughly familiarizing academic administrators and faculty committees with the new kinds of data produced by the IEP cost study. One institution stated that "the people who know something about cost studies and models say there is a better way, while people who know little or nothing about cost studies remain reluctant and apathetic." To overcome these general apprehensions, many institutions took one or more of the

following approaches: (1) developing for department-level administrators and academic committees useful specific cost data reports that excluded much unnecessary detail; (2) involving both faculty and administrative staff in the collection of data and validation of resulting information, (3) establishing in-house training programs related to the purpose of the cost study and the potential uses of resulting information. Those institutions that gained high-level commitment of both faculty and administrators involved a wide range of individuals from all organizational levels throughout all phases of the cost study. By using this approach, many institutions created a cooperative and enthusiastic environment that motivated those conducting the cost study to complete their tasks on time and encouraged decision makers at all levels to approach the resulting information without undue bias or apprehension.

During the field test project, NCHEMS provided limited consulting support to the institutions. Most institutions feel this support was very helpful. NCHEMS staff members were instrumental in alerting users to known problems and thus the waste of local campus resources was often avoided. Although the consulting support from NCHEMS was welcomed by the participants, most of the institutions believe that their existing in-house staff could have completed the project without such help. However, they feel that more time would have been required for local personnel to complete the cost study without NCHEMS support.

NCHEMS is extremely grateful to all of the participating institutions that completed the preliminary IEP cost study field test. Without the help of these

institutions, the NCHEMS work in seeking to devise acceptable standards for developing costs and other data would suffer greatly from the lack of institutional inputs and experience.

As a result of the field test effort, NCHEMS has learned much. First, certain portions of the IEP standard activity structure (PCS) and the definitions and procedures must be altered to be more readily acceptable to institutions and applicable to their needs. Second, many institutions throughout the nation are not fearful of displaying their cost data. Their concern is only that the cost data be developed in a legitimate fashion, fairly representing the actual utilization of the institution's resources. Many educators appear to be searching continually for methods of improving their decision-making capability. Far from being protective of their cost information, they appear to be eager to discover what they consider inequities in the distribution of resources on their local campuses. Only by illuminating their internal management problems can they develop mechanisms for taking corrective action.

Certainly many administrators are fearful of the misuse of cost data and other information by those who will not take sufficient time to become thoroughly acquainted with the institution in all of its aspects. However, many of these administrators feel that, given the choice between having better information available to all or not having sufficient information for intelligent decision making, they are better off with the greater abundance of data. If nothing else, the preliminary IEP field test institutions have shown that a great deal of capability exists on local campuses

to conduct the kind of cost study that the Information Exchange Procedures prescribe. In the past, it had been feared that the typical campus would have to devote such a major portion of its limited resources to complete such a cost study that the results simply could not be worth the effort. NCHEMS has long assumed that its management tools would never be widely adopted if they were either too complex or too expensive for the typical institution. The completion of a standard cost study requires a great deal of internal organization and a considerable amount of work. It does not appear to require an exorbitant amount of cash expenditures. Clearly, an analysis of the costs and the benefits of conducting an IEP cost study on institutions developing various kinds of cost information to ascertain if the new management information does, in fact, serve the local campuses in a positive manner.

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